Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

Claim 1 (Currently amended): A frequency analyzer for analyzing a plurality of input signals $x_0(m)...x_r(m)...x_{M-1}(m)$, the frequency analyzer comprising:

a plurality of input modulators for modulating and shifting said input signals $x_0(m)...x_r(m)...x_{M-1}(m)$, defining shifted output signals[[.]];

a polyphase filter network which includes a plurality of polyphase filters $p_0(m)...p_\rho(m)...p_{M-1}(m)$ for receiving said shifted output signals and defining polyphase filter output signals; and

a plurality of output modulators for modulating the output of said polyphase filters, said frequency analyzer configured to synthesize said plurality of input signals $x_0(m)...x_r(m)...x_{M-1}(m)$ and provide a single output signal x_r.

Claim 2 (Original): The frequency synthesizer as recited in claim 1, wherein said input modulators includes means for multiplying said input signals $x_0(m)...x_r(m)...x_{M-1}(m)$ by a factor $e^{-j2\pi k_o m}$, where k_0 is a selectable odd/even stacking factor.

Claim 3 (Original): The frequency synthesizer as recited in claim 1, wherein said output modulator includes means for multiplying said polyphase filter output signals by a factor $e^{-j2\pi kop/M}$, where k_0 is a suitable odd/even stacking factor and p is the channel, and M is total number of channels.

Claim 4 (Original): A polyphase filter comprising:

a plurality of filter channels,

$$\overline{p}_0(m)...\overline{p}_\rho(m)...\overline{p}_{M-1}(m)$$

for filtering a plurality of input signals $x_0(m)...x_p(m)..x_{M-1}(m)$;

a complex modulator, which modulates each input signal $x_0(m)...x_p(m)...x_{M-1}(m)$ by a factor $(-1)^m$, where m is the time index; and

a plurality of output modulators for modulating each of the outputs of said plurality filter channels by a modulation factor.

Claim 5 (Original): The polyphase filter as recited in claim 4, wherein said complex modulation factor is $e^{-j2\pi kop/M}$, where k_o is a selectable odd/even stacking factor, p is the channel and M is the number of channels.

Claim 6 (Original): A complex modulator for generating a signal $(-1)^m$, where m is a time index, the modulator comprising:

a multiplexer adapted to receive an input signal IN at one input and an inverted input at another input;

an AND gate having at least two inputs and an output, said output for controlling said multiplexer; and

a divider for dividing a clock signal by two defining a divided signal, said divided signal applied to one input of said AND gate;

wherein said AND gate is adapted to receive an odd/even stacking factor k_o at the other of said inputs of said AND gate.

Claim 7 (Currently amended): The frequency analyzer as recited in claim 1, wherein said input modulators include an inverter and ~~a~~ one more multiplexers for receiving one or more compensation vectors for selectively negating said input signals.

Claim 8 (Currently amended): A frequency synthesizer for synthesizing a plurality of input signals $x_0(m)...x_r(m)...x_{M-1}(m)$, the frequency synthesizer comprising:

a plurality of input modulators for modulating and shifting said input signals $x_0(m)...x_r(m)...x_{M-1}(m)$, defining shifted output signals[[.]];

a polyphase filter network which includes a plurality of polyphase filters $p_0(m)...p_\rho(m)...p_{M-1}(m)$ for receiving said shifted output signals and defining polyphase filter output signals; and

a plurality of output modulators for modulating the output of said polyphase filters, said frequency analyzer configured to synthesize said plurality of input signals $x_0(m)...x_r(m)...x_{M-1}(m)$ and provide a single output signal x_r.

Claim 9 (Currently amended): The frequency synthesizer as recited in claim 8, wherein said input modulators include an inverter and ~~a~~ one more multiplexers for receiving one or more compensation vectors for selectively negating said input signals.